

Inundation Modeling, Breach Parameters, and Consequences (USACE Approach)

Best Practices in Dam and Levee Safety Risk Analysis
Part C – Consequence Estimating

Last modified June 2017, presented July 2018



US Army Corps
of Engineers®



Objectives

- Participants will become familiar with numerical approach for estimating loss of life



Why the Different Approaches?

- Empirical approaches tie important parameters to historic events
 - Characteristics of built infrastructure, population, etc
 - Historic record doesn't include scenario for typical USACE flood control dam (large dam above major population center)
 - Limited number of parameters make it harder to understand risk drivers and recommend appropriate risk reduction measures
- Simulation approaches improve ability to measure impacts on “non-structural” risk reduction measures
 - Explicit consideration of evacuation factors
 - Consider interaction of people with water throughout event

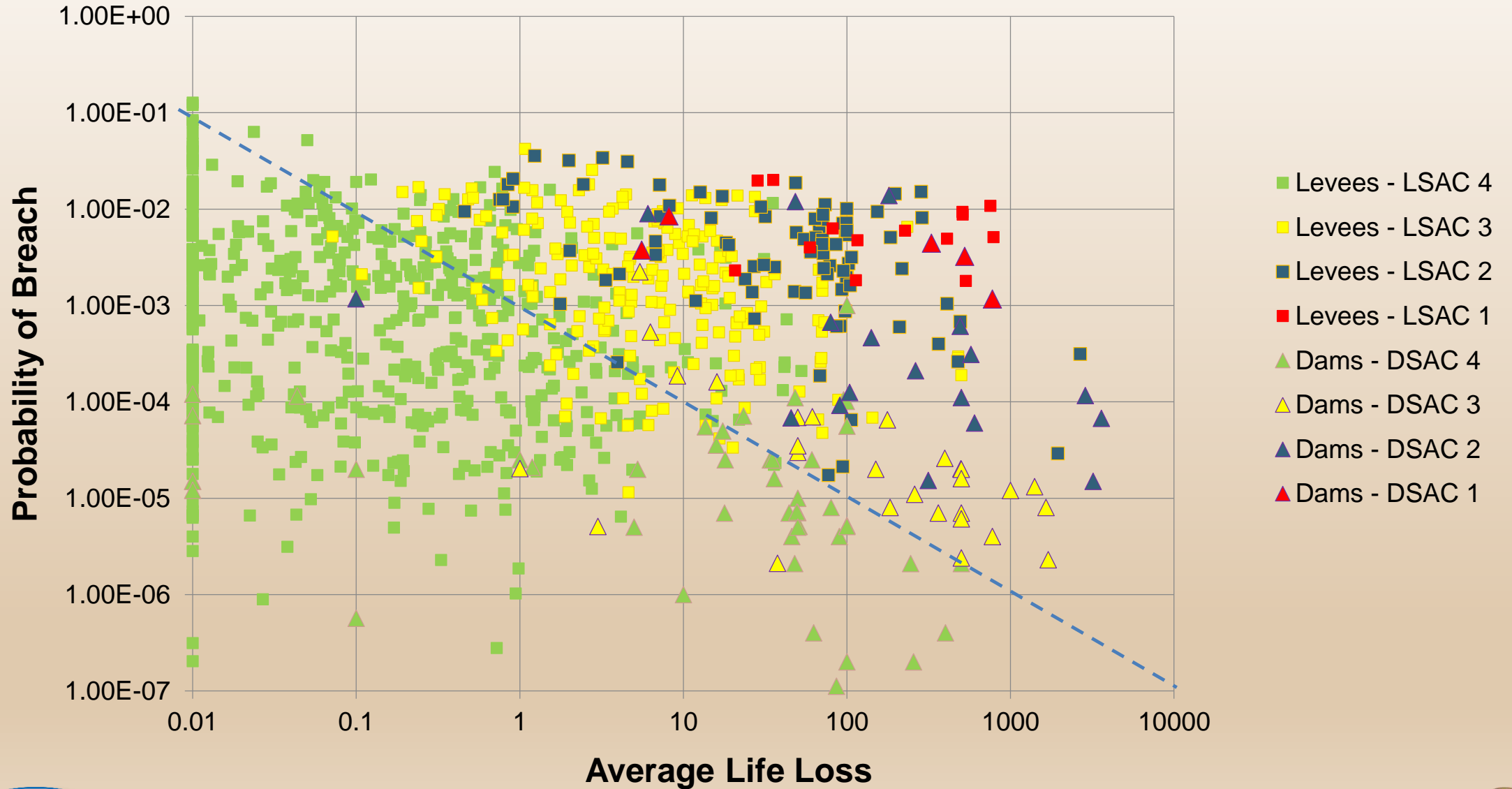


Essential Elements of Life Loss Estimate

- How many people are exposed to the flooding?
 - Initial distribution of people
 - Redistribution through evacuation
- How severe is the flooding?
- Are the people in a structure that can withstand the flooding?
- Will the people subjected to flooding die?



Risk Characterization

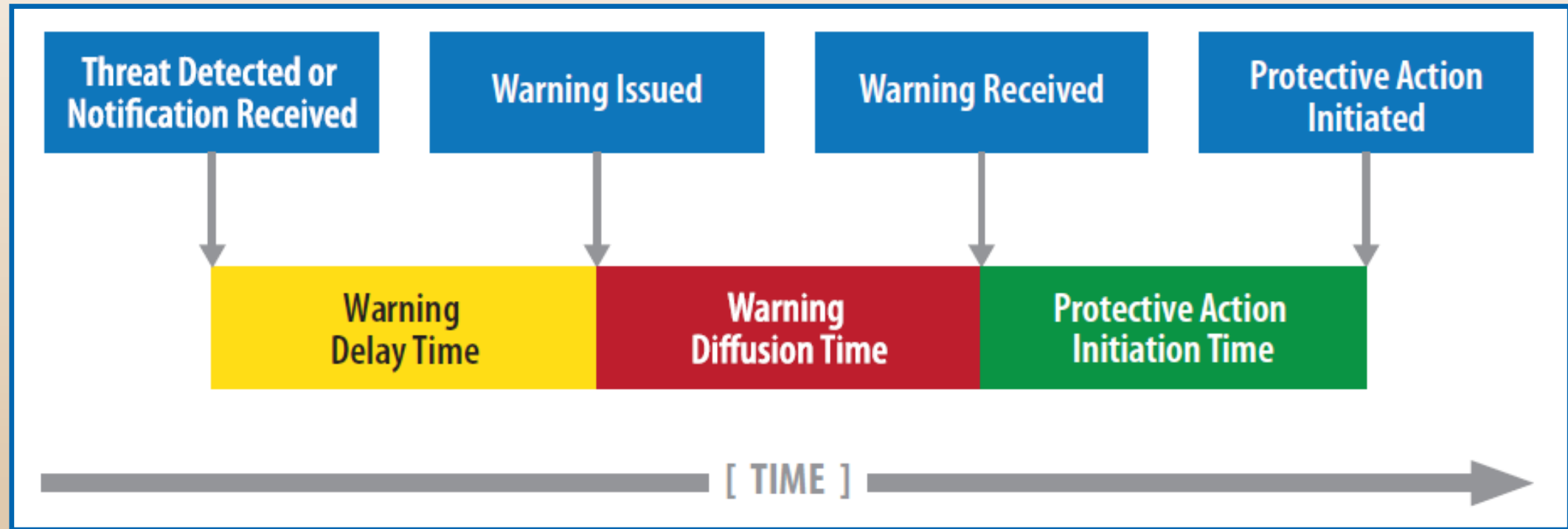


Numerical Life Loss Estimation Methods – Decision Driven

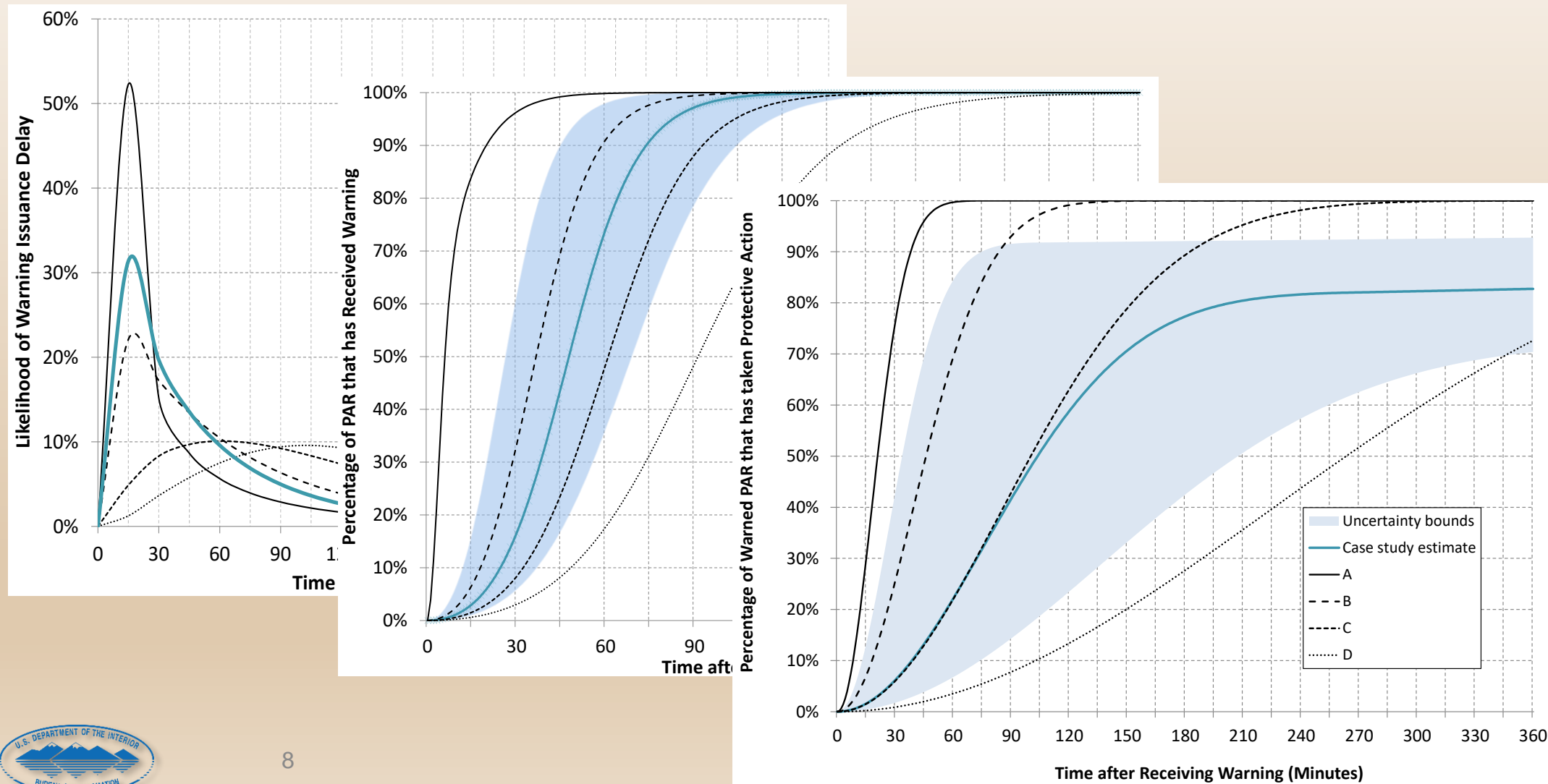
- Screening
 - Dams - Modified DSO-99-06 Method
 - Levees - Jonkman's Method
- Higher-level Risk Assessments
 - HEC-FIA (aka LifeSim)
 - Screening validation, issue evaluation and periodic assessments, major modification studies
 - Scalable application (simplified or detailed evacuation)



Redistribution of People (Evacuation Effectiveness)



Redistribution Through Evacuation



How Do We Reduce Uncertainty?

- Existing Information
 - Levee Screening Tool
 - Existing Reports
 - Informal Discussions
- Formal Elicitation

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INTERVIEW SCHEDULE Community Warning Issuance, Diffusion, and Protective Action Initiation Estimation*

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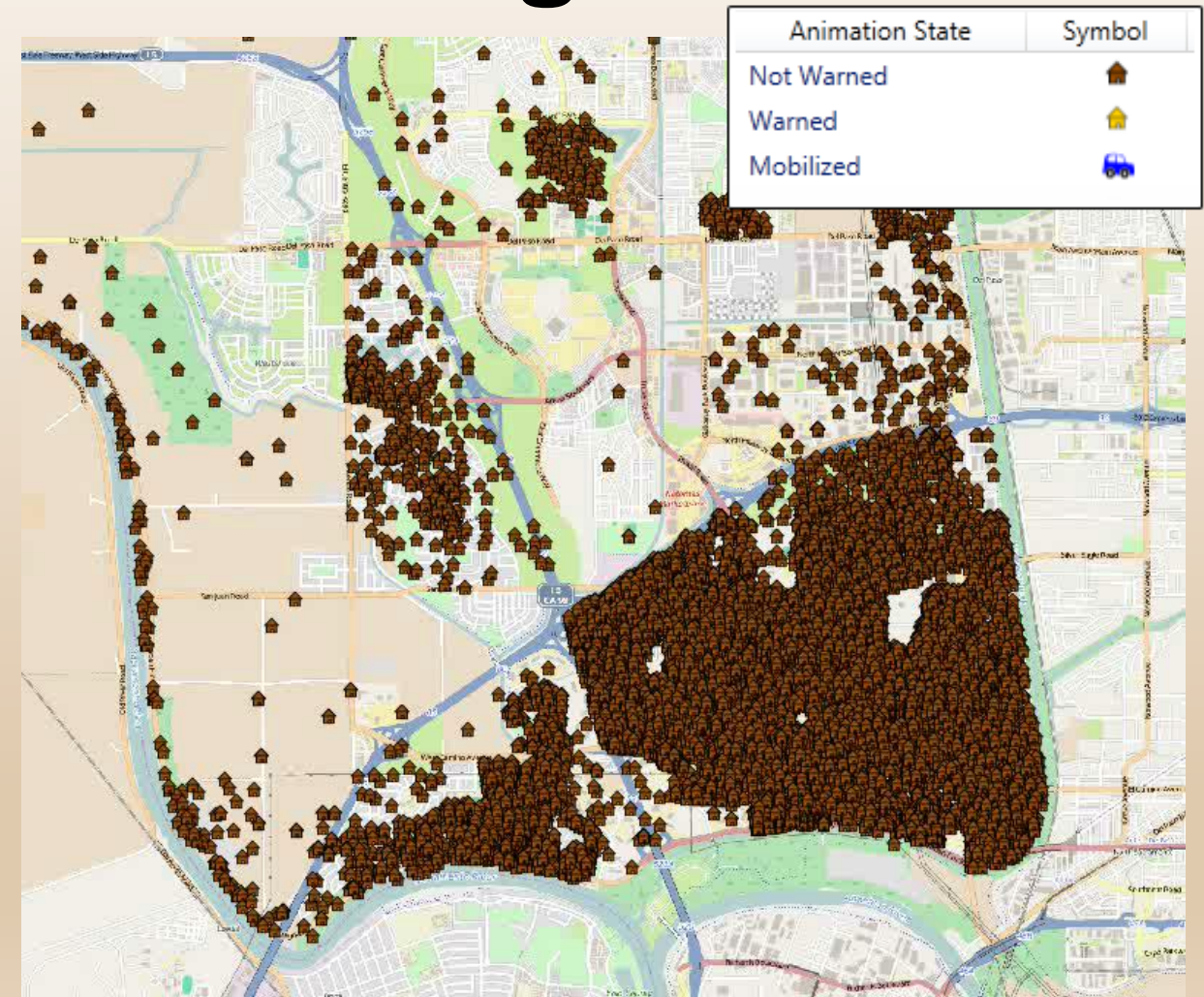
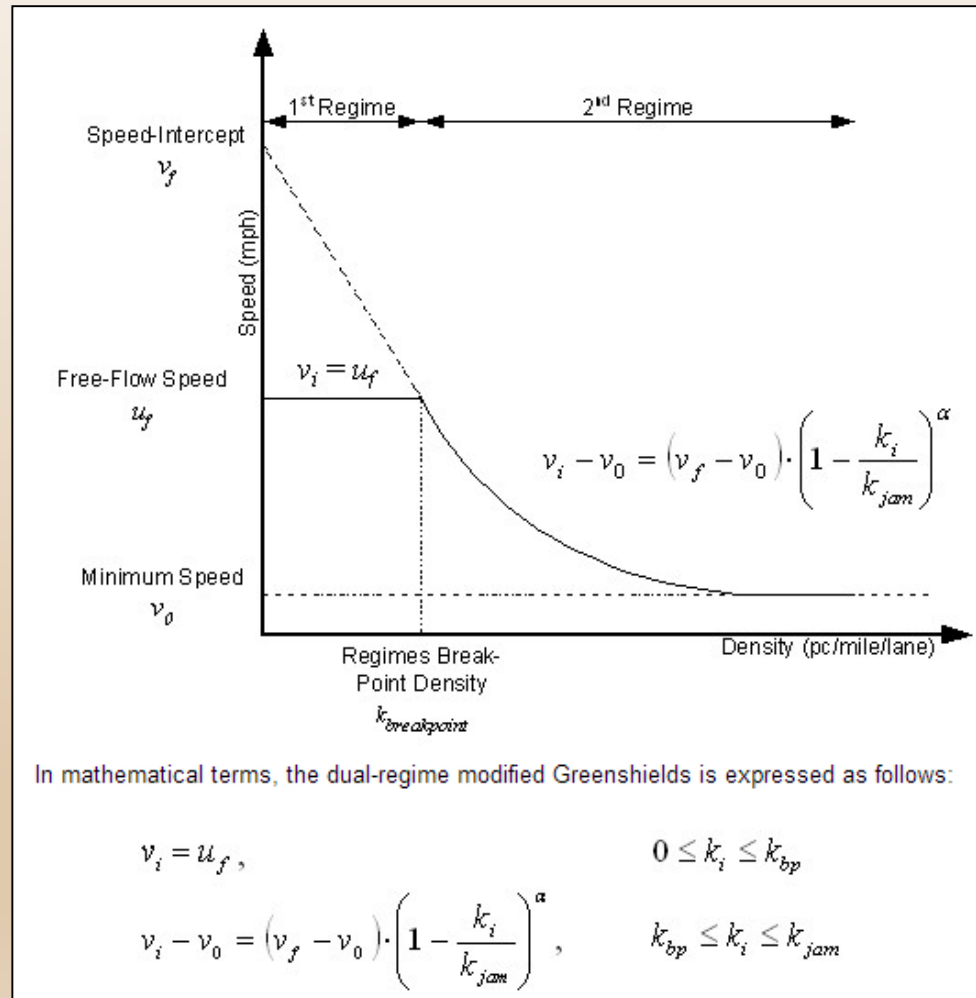


Managing Consequences – Improving Emergency Response



**A GUIDE TO
PUBLIC ALERTS
AND WARNINGS
FOR DAM
and Levee
EMERGENCIES**

Detailed Evacuation Modeling



LifeSim Demo

